

We claim:

1. A vertical load measurement device for measuring a load at least partially supported by an axle of a railcar comprising:
 - a bearing adapter sized to be mounted between a load bearing member of the railcar and an axle bearing housing of the railcar;
 - at least one beam member having a first end and a second end, at least one of said first end and said second end being secured to said bearing adapter, and a midsection extending between said first end and said second end which supports the load applied by the load bearing member of the railcar, said midsection being vertically spaced from said bearing adapter to allow deflection of said at least one beam member in response to the load applied by the load bearing member; and
 - a sensor secured to said beam member which measures said deflection of said beam member.
2. The measurement device of claim 1, wherein said bearing adapter includes an axle receiving portion.
3. The measurement device of claim 2, wherein said axle receiving portion is substantially semicircular in shape.
4. The measurement device of claim 1, wherein said at least one beam member is secured to said bearing adapter and oriented perpendicular to said load bearing member.
5. The measurement device of claim 4, wherein said load bearing member is a side frame of a truck of the railcar.

6. The measurement device of claim 4, wherein said at least one beam member is secured to said bearing adapter at both said first end and said second end to establish a fixed end condition at both ends.

7. The measurement device of claim 1, wherein said at least one beam member includes a protrusion at an underside of said midsection, said protrusion extending toward said bearing adapter to limit deflection of said midsection of said beam member.

8. The measurement device of claim 1, wherein said at least one beam member further includes a load bearing section on a top surface of said midsection, the load bearing member contacting said load bearing section to exert the load thereon.

9. The measurement device of claim 1, wherein said sensor is at least one strain gauge.

10. The measurement device of claim 9, wherein said at least one strain gauge is secured to said underside of said midsection.

11. The measurement device of claim 9, wherein said at least one strain gauge is a plurality of strain gauges.

12. The measurement device of claim 1, wherein said at least one beam member is a plurality of beam members, each having a first end, a second end, and a midsection extending therebetween, said plurality of beam members being positioned parallel to each other and secured to said bearing adapter.

13. The measurement device of claim 12, wherein said midsection of each of

said plurality of beam members is vertically spaced from said bearing adapter to allow deflection of said plurality of beam members in response to the load applied by the load bearing member.

14. The measurement device of claim 13, wherein each of said plurality of beam members includes a protrusion at an underside of said midsection that extends toward said bearing adapter to limit deflection.

15. The measurement device of claim 12, wherein each of said plurality of beam members are secured to said bearing adapter at both said first end and said second end to establish a fixed end condition at both ends.

16. A vertical load measurement device for measuring a load at least partially supported by an axle of a railcar comprising:

- a bearing adapter sized to be mounted between a load bearing member of the railcar and an axle bearing housing of the railcar, said bearing adapter including a semicircular shaped axle receiving portion;

- a plurality of beam members, each beam member having a first end and a second end that are secured to said bearing adapter, and a midsection extending between said first end and said second end which supports the load applied by the load bearing member of the railcar, said midsection being vertically spaced from said bearing adapter to allow said beam member to deflect in response to the load applied by the load bearing member; and

- a plurality of sensors secured to an underside of each beam member that measures deflection thereof.

17. The measurement device of claim 16, wherein each of said plurality of beam members includes a protrusion at said underside of said midsection that extends toward said bearing adapter.

18. The measurement device of claim 16, wherein said sensor is a plurality of strain gauges.

19. A method for measuring vertical load at least partially supported by an axle of a railcar having a load bearing member and an axle bearing housing, said method comprising the steps of:

mounting a bearing adapter between the load bearing member of the railcar and the axle bearing housing of the railcar;

providing at least one beam member having a first end, a second end, and a midsection extending between said first end and said second end;

securing at least one of said first end and said second end of said at least one beam member to said bearing adapter in a manner that said midsection is vertically spaced from said bearing adapter;

supporting the load applied by the load bearing member of the railcar with said midsection of said at least one beam member, said midsection of said at least one beam member being deflected in response to the supported load; and

measuring the deflection of said midsection of said at least one beam member.

20. The method of claim 19, further including the step of converting said measured deflection into a load exerted by the load bearing member.

21. The method of claim 19, wherein said step of measuring the deflection of said midsection includes the step of measuring strain in said midsection of said at least one beam member.

22. The method of claim 19, wherein said bearing adapter includes a substantially semicircular axle receiving portion, said method further including

the step of mounting said bearing adapter so that said axle bearing housing is received in said axle receiving portion.

23. The method of claim 19, wherein said step of securing at least one of said first end and said second end of said at least one beam member to said bearing adapter includes the step of securing both of said first end and said second end to establish a fixed end condition at each end.

24. The method of claim 19, further including the step of providing a protrusion at an underside of said midsection of said at least one beam member which extends toward said bearing adapter to limit deflection of said midsection of said beam member.

25. The method of claim 19, wherein said step of measuring the deflection of said midsection of said at least one beam member is attained by at least one sensor secured to an underside of said midsection.

26. The method of claim 25, wherein said at least one sensor is a plurality of strain gauges.